

Larval dispersal and juvenile dynamics of flatfish in the Southern North Sea

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Marine populations display some of the most extreme patterns of spatial and temporal heterogeneity in demographic factors. Over the past few decades, many marine fisheries have declined or even collapsed. This is in large part, due to climate change and detrimental anthropogenic influences (e.g. habitat degradation and overfishing). Due to a highly complex optimal window between biological needs and favorable environmental factors, marine species are very susceptible to natural perturbations. This leads to unpredictable reproductive success, high mortality and obscure population delineations. Preventing a complete collapse of fish stock requires a thorough knowledge of the recruitment dynamics. With the B-FishConnect project we want to disentangle the physical and biological factors influencing dispersal and recruitment in flatfish. Within the project, we will focus on four commercially important flatfish species in the North Sea: sole, plaice, turbot and brill. To quantify the role of physical and biological factors on the population dynamics, a combination of hydrodynamic and demographic-genetic models will be applied. The output of these models will be compared to empirical field data. The focus of this project will be on the post-larval and juvenile stages of flatfish. Information on the spatial-temporal dynamics of larvae and juveniles will be gathered by an intense sampling campaign along the coast as well as on sea. Additional information will be obtained through historical datasets. The larval dispersal history will be inferred by analysing the otolith microstructure of juvenile flatfish. The effect of the larval history and local habitat characteristics on the future survival and condition of juvenile flatfish will be investigated. This will be accomplished by using biomarkers and condition indices. The derived information on life-history traits, population structure and spatio-temporal dynamics will be used to validate the dispersal models (Lacroix *et al.*, 2013). In a later phase this will allow us to test different ecological hypotheses and to assess the impact of various scenarios related to climate change and human impact on flatfish in the North Sea. Consequently these data will be vital for fisheries and conservation management.

References

Lacroix G., G.E. Maes, L.J. Bolle and F.A.M. Volckaert. 2013. Modelling dispersal dynamics of the early life stages of a marine flatfish (*Solea solea* L.). *Journal of Sea Research* 84:13-25.